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Control and Elimination of Quackgrass

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FS 497

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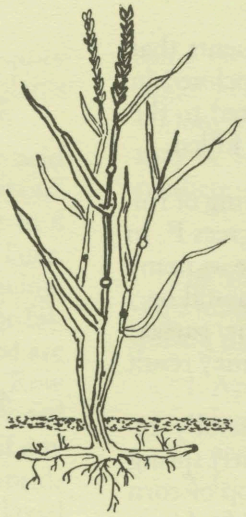
Figure 1. A mature quackgrass plant with a young plant growing from the same rhizome

COOPERATIVE EXTENSION SERVICE
SOUTH DAKOTA STATE UNIVERSITY
UNITED STATES DEPARTMENT OF AGRICULTURE

Control and Elimination of QUACKGRASS



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Quackgrass[1] is one of the most widely spread of the eight noxious weeds in South Dakota. It is particularly prevalent in northern counties, but is found in all parts of the state. It has been reported on over 280,000 acres on more than 14,000 South Dakota farms, but these reports do not include all rangeland infestations.

Quackgrass is a perennial grass that spreads by seeds and underground stems (rhizomes). It produces a great quantity of viable seed, which may retain its ability to germinate for at least 4 years in storage or in the soil. Quackgrass seeds cannot be removed from seed of many of our common grasses, especially bromegrass or wheatgrasses. If at all possible, sow only certified grass seed. Seeds of other crops must be cleaned with extreme care.

Screenings or forage infested with quackgrass seed often serve to spread the seed to new areas. Manure or mud on implement wheels or on the feet of animals, and improperly cleaned seeding or threshing equipment can also spread quackgrass seeds to a new location.

The rhizomes spread laterally in the upper 3 to 6 inches of soil. They are capable of producing new plants at each node (joint) and may grow through the soil for considerable distances, producing new shoots at frequent intervals, eventually forming a dense sod. Pieces of rhizomes may be carried on the plow or other tillage implements such as the field cultivator, or in mud on implement wheels, and thus spread the weed to uninfested areas.

Quackgrass is frequently confused with other grasses. Some ways of distinguishing it from several other grasses are summarized in Table 1. and are illustrated in Figures 2 and 3.

[1]*Agropyron repens L.*

Combinations of cultivations, croppings, and chemicals can reduce the new stand of quackgrass by 90 per cent or more in one year.

INTENSIVE CULTIVATION

Cultivation is used primarily for starving other weeds. However, for quackgrass, it may be used for starving the plant by reducing root reserves, drying the rhizomes and top growth so that they die, and occasionally, exposing rhizomes to freezing.

Root reserves can be reduced throughout the growing season, but dry weather (summer) is necessary for drying the rhizomes and cold weather (fall) is needed for freezing. Root reserves are depleted more rapidly if the weed is growing on fertile soil or has received an application of nitrogen. Likewise, heavy grazing for a year prior to cultivation will aid in eliminating the weed.

Spring. Cultivation is aimed at reducing the root reserves. Cultivate it whenever leaves become 2-3 inches long (about every 3 weeks). A sharp one-way disk operated at a depth of 2 or 3 inches is the preferred implement. On unplowed sod use it once lengthwise and once crosswise for the first operation. If a one-way is not available, plow shallowly and disk to cut up the sod. Use a disk harrow for later operations. A duckfoot field cultivator is a satisfactory implement when trash does not prevent its use, but it may carry rhizomes from one area to another.

Summer. Cultivate every 3 weeks with a one-way disk or duckfoot cultivator to reduce root reserves. In dry seasons, a heavy duty spring-toothed field cultivator may be used to aid in reducing root reserves and to lift rhizomes to the surface of the soil where they will dry in 4 or 5 days of dry weather. Weekly cultivations with a spring-toothed harrow are needed to

bring to the surface all the rhizome fragments that have been buried. Quackgrass fragments enclosed in clods, partially covered with soil, or anchored to the soil are not likely to be dried enough to be killed.

Late fall. Cultivation will aid in the freezing of rhizomes when temperatures are below 20 degrees F. In order to freeze them it is essential to expose as many rhizomes as possible. The last cultivation should be a deep cultivation or plowing and leave the surface rough. It will aid in preventing erosion and may result in additional kill by freezing.

An entire season of cultivation is generally required to eliminate quackgrass. However, early spring cultivation followed by a crosscultivated crop of corn reduces the stand and holds the weed in check. Allow the quackgrass to start its growth and plow deeply. The plant is buried deeply. Reappearance is delayed and root reserves reduced because it must produce a long shoot to reach the surface. Either cultivate deeply before planting the crop or plant immediately after plowing.

After-small-grain-harvest cultivation during late summer and fall reduces quackgrass stands, especially during dry years and when freezing has been effective.

CULTIVATION, CROPS, AND CHEMICALS*

The following chemicals are recommended for quackgrass control in conjunction with specific crops and tillage operations. Although their cost is relatively high, they will give 90 per cent elimination of the weed in one season.

Atrazine is formulated as wettable powder to be applied as a spray. Application of atrazine on cropland is one of the best chemical methods of controlling quackgrass; however, small grains, forage crops or soybeans may be damaged by chemical residue if these crops are seeded the second spring after application of this herbicide. Atrazine applications for quackgrass control are best when applied in 20 gallons of water per acre.

There are five ways to use atrazine. In most cases atrazine does not give 100 per cent elimination, and fallow operations or cultivation of corn kills the stragglers.

1. On cropland with normal amount of crop residue, apply 4 pounds active ingredient (5 pounds of AAtrex 80W product) per acre in the fall between September 15 and November 1. Plow in late fall or the next spring (1 to 3 weeks after treatment). Plant corn and cultivate or fallow for a season.
2. On cropland with normal amount of crop residue, apply 4 pounds active ingredient (5 pounds of AAtrex 80W product) per acre in the spring. Plow treated area 1 to 3 weeks after treatment. Plant corn and cultivate or fallow for a season.
3. On cropland with normal amount of crop residue, apply 2 pounds active ingredient (2½ pounds of AAtrex 80W product) per acre between September 15 and May 1. Plow in late fall or the next spring (1 to 3 weeks after treatment). Prepare soil, plant corn and apply 2 pounds active ingredient (2½ pounds of AAtrex 80W product) before quackgrass is 1½ inches tall. Cultivate the corn.
4. On cropland with heavy residue, plow during late summer. Treat regrowth with 4 pounds active ingredient (5 pounds of AAtrex 80W product) in the fall or spring. Disk treated area 1 to 3 weeks after treatment. Plant corn and cultivate or fallow for a season.
5. On non-cropland, apply 8 pounds active ingredient of atrazine or simazine (10 pounds of AAtrex 80W or Princep 80W product) per acre between September 15 and the first snowfall.

Amitrole-T is a liquid concentrate to be mixed with water and applied as a spray. Amitrole-T contains amitrole and ammonium thiocyanate and is superior to amitrole alone for the control of perennial weeds. Amitrole-T is sold under the tradenames "Amitrole-T" and "Cytrol," both containing 2 pounds active ingredient per gallon. In most cases amitrole-T does not give 100 per cent elimination. Fallow operations or cultivation of a row crop kills the stragglers.

Apply amitrole-T during the spring when quackgrass is 4 to 8 inches tall. Use 4 pounds of amitrole-T (2 gallons of Cytrol or Amitrole-T product) in 40 to 50 gallons of spray solution per acre. Plow treated area 2 to 3 weeks after spraying. Fallow for a season, or plant corn and cultivate.

Atrazine and amitrole-T may be used in combination before planting corn or sorghum. Apply 2 pounds of amitrole-T (1 gallon of Cytrol or Amitrole-T products) after quackgrass has "greened up" in the spring. Plow 2 to 3 weeks later and plant corn or sorghum. Apply 2½ pounds of atrazine (3⅛ pounds of Atrazine 80W product) shortly after planting to control quackgrass and annual weeds. Cultivate the crop.

Dalapon is sold as a powder, under the tradename "Dowpon," to be dissolved in water and applied as spray. It is more effective when used in conjunction with tillage operations than when used alone. You cannot expect to kill more than 90 or 95 per cent of the weeds. Dalapon is more readily absorbed by plant tops than by roots. Use enough water to dissolve the dalapon and give good coverage.

There are two ways to use dalapon. Both require the use of cultivation in row crops to kill the plants not eliminated by the herbicide.

1. For spring treatments apply 6 pounds acid equivalent of dalapon (8 pounds of "Dowpon" product) per acre when quackgrass is 4 to 8 inches tall. Plow treated area 7 to 10 days later. Disk treated areas several times after plowing. Plant a crop 4 to 6 weeks after spraying or fallow for a season. Crops that can be planted are corn, sorghum, soybeans and alfalfa. Row crops are best suited since they can be cultivated allowing control of quackgrass regrowth if any is present. Early maturing varieties or hybrids may need to be planted because of delayed planting.
2. For fall treatment, mow to remove top growth during August. Treat regrowth with 10 pounds acid equivalent of dalapon (12½ pounds of "Dowpon" product) per acre (at least one week before the first killing frost is expected) when quackgrass is 4 to 8 inches high. Plow during late fall or the next spring (not less than 7 days after spraying). Plant corn and cultivate or fallow for a season.

TCA, a chemical closely related to dalapon, is more effective when applied to rhizomes of quackgrass during the fall of the year. It is sold under numerous tradenames as a powder or granules to be dissolved in water and applied as a spray. It is absorbed by plant roots. It seldom kills more than 90-95 per cent of the weeds.

Plow shallowly to get a maximum number of rhizomes on the surface of the soil. Spray immediately with 20 pounds of TCA acid equivalent (25 pounds of 90 per cent product, which is 80 per cent acid equivalent) per acre. Residual effect may injure some crops seeded the next spring. Potatoes, flax, sugar beets, alfalfa, birdsfoot trefoil, and oats are seldom injured; but corn, soybeans, and red clover may be severely injured. Barley and wheat are intermediate in sensitivity.

SHELTERBELTS

Use simazine alone during the fall of the year or use a mixture of amitrole or amitrole-T with simazine during the spring.

1. Apply 4 pounds active ingredient per acre during the fall (5 pounds of Princep 80W) per acre (2 to 2½ tablespoons per square rod).
2. In the spring mix 4 pounds per acre (2 tablespoons per square rod) of amitrole or 2 pounds (1 gallon) per acre (1¾ tablespoons per square rod) of amitrole-T with 6 pounds per acre (2 tablespoons per square rod) of simazine. Apply in a band at the base of the trees.

COST OF CHEMICALS

The cost of these chemicals varies from year to year. However, the approximate cost of a pound of active ingredient for the before-mentioned chemicals is as follows: dalapon $1.60; TCA $0.50; amitrole-T $5.00; atrazine $3.20; and simazine $3.55.

SPECIAL CROPPING

The three cropping systems presented here have practical use in areas unsuited to long periods of intensive cultivation. These practices reduce stands but much slower than the chemical treatments listed before.

*Complete chemical names for herbicides used for quackgrass control are: dalapon—2-2 dichloropropionic acid; TCA—trichloroacetic acid; atrazine, 2-2 chloro-4-ethylamino-6-isopropylamina—s-triazine; simazine—2-chloro-4,6-bis-(ethyl-amino)-s-triazine; amitrole-T—3-omino-1,2,4-triazole plus ammonium thiocyanate

Summary of Vegetative Characters by Which Quackgrass Can Be Distinguished from Several Other Grasses

Grass	Growth Habit	Leaf blade*	Leaf sheath*	Rhizomes*	Auricles*	Ligule*
Quackgrass	sod-forming	flat, smooth hairy at base	hairy, split, overlapping	white	short, clawlike	short
Bromegrass	sod-forming	flat, smooth	smooth, continuous	tan	generally none	large, smooth
Western Wheatgrass	sod-forming	rolled, rigid, rough upper surface; saw-toothed edges	smooth, split	tan	long, colored	minute, smooth
Slender Wheatgrass	bunch-type	flat, smooth	smooth, split	none	none	minute, hairy
Ryegrass	bunch-type	flat, smooth	smooth, split	none	short	very short, membranous

*For location of these plant parts, see illustration.

Plan One. During the first year plant small grain underseeded with sweet clover. Plow under for green manure the following year. Plow 5 inches deep and cultivate extensively until fall. The third year, plant a row crop and do a thorough job of cultivating. Pick up stray plants.

Plan Two. Plant small grain and seed it to sweet clover. The next year cut the clover for hay. Plow 5 inches deep immediately after cutting the hay. Follow an extensive cultivation program until Sept. 10-20, when rye should be seeded at 2 bushels per acre.

The third year combine the rye crop and plow to a depth of 5 inches immediately after harvest. Cultivate extensively until fall. Finally plant to a row crop the fourth year and do a good job of cultivating. Clean up stray plants.

Plan Three. This method is especially effective when the spring of the first year is dry. Cultivate extensively the first year from the time the quackgrass reaches a height of 2 inches until June 15 or July 1. Drill in German millet, proso millet, or buckwheat where it is adapted. Cut the German millet for hay, but harvest the proso millet or buckwheat for seed.

Figure 3. Portions of spikes of quackgrass and perennial ryegrass: A) side-view of quackgrass showing how flat side of spikelet is attached to the rachis; B) a view of the same spike of quackgrass after it was turned one-fourth turn; and C) ryegrass spike viewed from same angle as in B, showing that the narrow edge of spikelet is attached to the rachis.

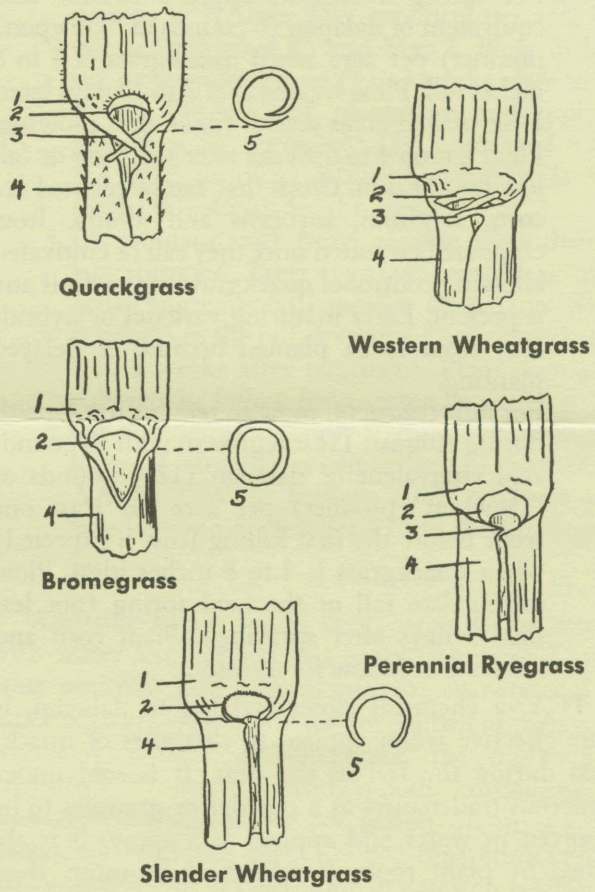

Figure 2. Detailed drawings of young leaves of Quackgrass, Bromegrass, Western wheatgrass, Slender wheatgrass, and Perennial ryegras, show the difference in: 1) base of the leaf blade; 2) ligule; 3) auricles; 4) leaf sheath; and 5) cross-section of the leaf sheath.

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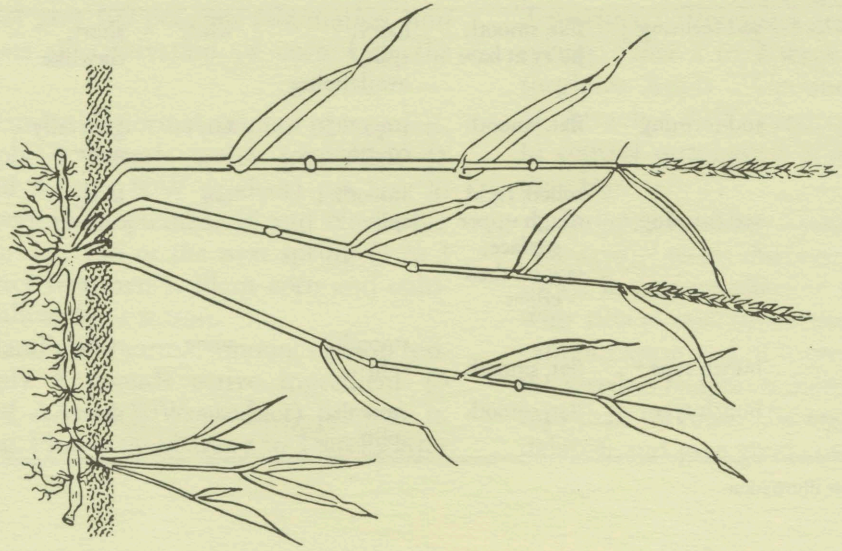

Figure 1. A mature quackgrass plant with a young plant growing from the same rhizome

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